CLAIMS

What is claimed is:

1. An electronic device, comprising:

a base comprising a pair of elongate flanges and a channel portion therebetween, the channel portion having a substantially planar first surface, wherein the pair of flanges extend generally perpendicularly from the first surface, and wherein the pair of flanges are separated by a predetermined channel width;

a ceramic circuit board comprising a substantially planar second surface, wherein the second surface is substantially parallel to the first surface and operable to mate with the first surface within the channel width; and

an adhesive layer generally residing between the first surface and the second surface, wherein the adhesive layer fixedly couples the first surface of the base to the second surface of the circuit board,

wherein the pair of flanges are operable to substantially maintain the planarity of the first surface and the second surface during a thermal expansion or contraction of one or more of the base and the circuit board.

2. The device of claim 1, wherein the circuit board further comprises a third surface, wherein a thickness of the circuit board is measured between the second surface and the third surface, and wherein at least one of the pair of flanges extends a first distance from the first surface, wherein the first distance is associated with the thickness of the circuit board.

3. The device of claim 2, wherein the first distance is greater than or approximately equal to the thickness of the circuit board.

4. The device of claim 2, wherein first distance is greater than or approximately equal to a sum of the thickness of the circuit board and a thickness of the adhesive layer.

5. The device of claim 2, wherein the pair of flanges extend the first distance from the first surface.

6. The device of claim 2, wherein the base further comprises a bottom surface, wherein a second distance is measured between the first surface and the bottom surface of the base, and wherein the second distance is further associated with the thickness of the circuit board.

7. The device of claim 6, wherein the second distance is less than five times the thickness of the circuit board.

8. The device of claim 6, wherein the bottom surface of the base is generally parallel to the first surface.

9. The device of claim 1, wherein the base is a contiguous piece of metal.

10. The device of claim 1, wherein the pair of flanges extend along a length of the channel, wherein the length of the channel is greater than or approximately equal to a length of the circuit board.

11. The device of claim 1, wherein the base is associated with a first coefficient of thermal expansion and the circuit board is associated with a second coefficient of thermal expansion, wherein the first coefficient of thermal expansion and the second coefficient of thermal expansion are dissimilar.

12. The device of claim 11, wherein the first coefficient of thermal expansion is greater than the second coefficient of thermal expansion.

13. The device of claim 1, wherein the base is comprised of copper or a copper alloy.

14. The device of claim 13, wherein the base is comprised of an alloy of copper and zirconium.

15. The device of claim 1, wherein the base is coated with one or more metal coatings.

16. The device of claim 15, wherein the one or more metal coatings comprise one or more of gold or nickel.

17. The device of claim 15, wherein a thickness of the one or more metal coatings is approximately 0.15 microinches.

18. The device of claim 1, wherein the adhesive layer is electrically conductive.

19. The device of claim 18, wherein the adhesive layer comprises silver or a silver alloy.

20. The device of claim 1, wherein the adhesive layer has a modulus of elasticity of about 80 MPa.

21. The device of claim 1, wherein the adhesive layer comprises a thermal-set epoxy.

22. The device of claim 1, wherein the base further comprises one or more secondary structures which extend generally perpendicularly to the first surface, and wherein the circuit board comprises one or more secondary cavities therein, wherein the one or more secondary structures are operable to generally reside within the respective one or more secondary cavities when the base is fixedly coupled to the circuit board.

23. An electronic device, comprising:

a metal base comprising a channel portion having a substantially planar first surface, the base further comprising a pair of flanges and one or more secondary structures which extend outwardly from the first surface, wherein a pair of flanges extend along a length of the first surface and are separated by a predetermined width, therein defining a channel therebetween;

a ceramic circuit board having a substantially planar second surface which is substantially parallel to the first surface, wherein the circuit board is generally defined by a length and a width, wherein the length and width of the circuit board are smaller than the respective length and width of the channel, wherein the circuit board resides within the channel; and

an epoxy layer generally residing between the first surface and the second surface, wherein the epoxy layer fixedly couples the first surface of the base to the second surface of the circuit board within the channel,

wherein the pair of flanges are operable to substantially maintain the planarity of the first surface and the second surface during a thermal expansion or contraction of one or more of the base and the circuit board.

24. The device of claim 23, wherein the pair of flanges and the plurality of segments extend generally perpendicularly to the first surface.

25. The device of claim 23, wherein the circuit board further comprises a third surface, wherein a thickness of the circuit board is measured between the second surface and the third surface, and wherein at least one of the pair of flanges extends a first distance from the first surface, wherein the first distance is associated with the thickness of the circuit board.

26. The device of claim 25, wherein the first distance is greater than or approximately equal to the thickness of the circuit board.

27. The device of claim 25, wherein first distance is greater than or approximately equal to a sum of the thickness of the circuit board and a thickness of the epoxy layer.

28, The device of claim 25, wherein the pair of segments extend the first distance from the first surface.

29. The device of claim 25, wherein the base further comprises a bottom surface, wherein a second distance is measured between the first surface and the bottom surface of the base, and wherein the second distance is further associated with the thickness of the circuit board.

30. The device of claim 29, wherein the second distance is less than five times the thickness of the circuit board.

31. The device of claim 29, wherein the bottom surface of the base is generally parallel to the first surface.

32. The device of claim 23, wherein the metal base is a contiguous piece of metal.

33. The device of claim 23, wherein the pair of flanges extend along a length of the channel, wherein the length of the channel is greater than or approximately equal to a length of the circuit board.

34. The device of claim 23, wherein the base is associated with a first coefficient of thermal expansion and the circuit board is associated with a second coefficient of thermal expansion, wherein the first coefficient of thermal expansion and the second coefficient of thermal expansion are dissimilar.

35. The device of claim 34, wherein the first coefficient of thermal expansion is greater than the second coefficient of thermal expansion.

36. The device of claim 23, wherein the base is comprised of copper or a copper alloy.

37. The device of claim 23, wherein the base is comprised of an alloy of copper and zirconium.

38. The device of claim 23, wherein the base is coated with one or more metal coatings.

39. The device of claim 38, wherein the one or more metal coatings comprise one or more of gold or nickel.

40. The device of claim 38, wherein a thickness of the one or more metal coatings is approximately 0.15 microinches.

41. The device of claim 23, wherein the epoxy layer is electrically conductive.

42. The device of claim 41, wherein the epoxy layer comprises silver or a silver alloy.

43. The device of claim 23, wherein the epoxy has a modulus of elasticity of approximately 80 MPa.

44. The device of claim 23, wherein the circuit board comprises one or more secondary cavities therein, wherein the one or more secondary structures are operable to generally reside within the respective one or more secondary cavities when the base is fixedly coupled to the circuit board.

45. A method of forming an electronic device, the method comprising:

providing a metal base;

providing a circuit board having a length, a width, and a depth;

forming a channel in said base, wherein the channel has a length, a width, and a depth associated with the respective length, width, and depth of the ceramic circuit board, and wherein the channel generally defines a pair of flanges extending along the length of the channel;

applying an adhesive layer onto one or more of the channel and circuit board;

placing the circuit board within the channel;

heating the base, the circuit board, and the adhesive to a predetermined temperature, wherein the base and the circuit board have differing coefficients of thermal expansion, wherein the base and the circuit board thermally expand by differing amounts during heating, and wherein the adhesive substantially cures at the predetermined temperature; and

cooling the base, the circuit board, and the adhesive, wherein the base and the circuit board thermally contract by differing amounts, therein inducing a stress between the base and the circuit board, and wherein the pair of flanges substantially restrict a flexure of the base and the circuit board caused by the induction of stress.

46. The method of claim 45, wherein the adhesive is comprised of a thermal-set epoxy, wherein the epoxy has a high modulus of elasticity when cured at the predetermined temperature.

47. The method of claim 46, wherein the modulus of elasticity of the epoxy is approximately 80 MPa.

48. The method of claim 45, wherein the stress is distributed about a stress plane by the pair of flanges, wherein the stress plane is associated with the length and width of the channel.

49. The method of claim 45, wherein forming the channel comprises machining the base.

50. The method of claim 45, wherein forming the channel comprises stamping the base.

51. The method of claim 45, wherein providing the circuit board comprises providing a ceramic circuit board having a low coefficient of thermal expansion.

52. The method of claim 45, wherein providing the metal base comprises providing a copper base.

53. An electronic device, comprising:

a base means having a channel and a flange means defined therein;

a circuit board means; and

an adhesive means, wherein the base means and circuit board means are fixedly coupled to one another, and wherein the flange means is operable to substantially maintain a planarity of the circuit board means and the base means during a thermal expansion or contraction of one or more of the base means and the circuit board means.

54. The device of claim 53, wherein the base means comprises one or more metals or a metal alloy.

55. The device of claim 53, wherein the circuit board means comprises a ceramic circuit board having a low coefficient of thermal expansion.

56. The device of claim 53, wherein the flange means comprises at least two flanges, wherein a channel is defined therebetween.

57. The device of claim 56, wherein the channel is associated with a size of the circuit board means.

58. The device of claim 53, wherein the adhesive means comprises an epoxy having a high modulus of elasticity.

59. The device of claim 53, wherein a thickness of the base means is less than five times a thickness of the circuit board means.